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VANCOUVER COASTAL HEALTH AUTHORITY TAKES ON COVID-19[[1]](#endnote-1)

Emma Coelho wrote this case under the supervision of Professor Gal Raz solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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We have a duty to our communities, whatever the capacity may be.[[2]](#endnote-2)

Roberta Scott, head of Vancouver Coastal Health Authority

On March 17, 2020, provincial health officer Bonnie Henry declared a public health emergency in British Columbia (BC) due to the COVID-19 pandemic spreading worldwide, including throughout Canada.[[3]](#endnote-3) This decision regulated non-essential work and travel within the province to curb the inevitable spread of COVID-19 among the public.

On the local level, the Vancouver Coastal Health Authority (VCHA) reported its first case on January 28, 2020, and had to adapt quickly.[[4]](#endnote-4) Cases increased in February and March, and by April 7, the VCHA was once again in the process of restructuring its COVID-19 response strategy to accommodate the growth in cases and to address the obstacles that followed. At both the provincial and federal levels, there was a shortage of testing swabs and personal protective equipment (PPE), in turn affecting the efficacy of the VCHA’s response. Limitations on testing capacity exacerbated this problem; the VCHA was completing approximately 3,000 tests per day, even though facilities were designed to complete over 5,000 tests per day.

Sitting at her office in the VCHA headquarters, Roberta Scott, head of the VCHA, wondered how she could better position the VCHA to combat COVID-19 in the long term while securing enough supplies. As Scott was concerned that COVID-19 cases would continue to surge, she knew this strategy had to be effective and time-sensitive.

Coronaviruses, COVID-19, and the Global Response

Coronaviruses were a family of viruses that affected the respiratory systems of both animals and humans, with symptoms parallel to those of a common cold. If severe, the virus responsible for COVID-19 could cause pneumonia, acute respiratory distress syndrome, influenza, kidney failure, and even death.[[5]](#endnote-5)

COVID-19 was a strain of coronavirus that was widely unfamiliar to expert scientists. The first case appeared on November 17, 2019, in Wuhan, China.[[6]](#endnote-6) Virus transmission was presumed to be airborne, meaning that individuals could spread the virus through breathing and talking at close range. The virus, via salivary droplets, could remain on specific surfaces and could also be transmitted once picked up. The virus could be absorbed through the eyes, nose, and mouth.[[7]](#endnote-7)

Patients demonstrated symptoms in two forms: symptomatic and asymptomatic. With symptomatic patients, individuals and health care professionals could detect COVID-19 through the symptoms alone. Asymptomatic individuals were mostly unaware that they were infected unless they were tested. As a result, asymptomatic individuals were more likely to spread the virus.

As information on the virus was limited, there was no confirmed vaccine to prevent transmission. At the time, a combination of existing medications was used to treat COVID-19 patients who were experiencing symptoms, with some success. However, social distancing and self-isolation mandates had proven to be even more effective. The World Health Organization (WHO) had advised everyone to remain one metre apart, to wear masks when out in public, to avoid non-essential travel, and to self-isolate when symptoms occurred.[[8]](#endnote-8)

Although the virus made its first appearance in China, it quickly spread across the globe. Countries, including the United Kingdom, Spain, Italy, and the United States, were infected more severely, exacerbating already existing public health concerns. As the virus continued to spread, many countries developed their own strategies, which often differed in terms of funding, medical accessibility, public policy, and, ultimately, the means by which to flatten the curve.

Canada's Health Care System

Canada’s federal health care system was responsible for upholding the quality of care across the nation. The federal government provided equalization payments to each province and territory to help fund standardized health care infrastructure, under the Canada Health Act, 1984. The act covered general health care costs for approximately 36 million Canadians in Canada, including general check-ups, vital prescriptions, and emergency surgeries.[[9]](#endnote-9)

However, 66 per cent of Canadian residents participated in privatized insurance plans, which helped cover extensive health care costs, such as non-essential prescriptions and surgeries, counselling, and therapy. Privatized insurance plans were most commonly offered through an employer or independently through a provider. All provinces and territories operated under this hybrid approach to ensure that the majority of Canadians had access to affordable care.

The Impact of COVID-19 in Canada

Canada reported its first case of COVID-19 on January 25, 2020, following the arrival of a traveller from Wuhan, China. From this date on, Canada’s cases grew exponentially, from 587 cases on March 17, 2020, to 17,897 cases on April 7, 2020.[[10]](#endnote-10) In addition to the health implications of COVID-19, the safety measures implemented across Canada resulted in an economic slowdown across many industries (see Exhibit 1). Industries such as retail, manufacturing, food and services, and airlines were hit hardest from the immediate halt of non-essential businesses. Consequently, Canadian unemployment rates began to plummet from 5.5 per cent in February 2020 to 7 per cent in March 2020, as businesses could not withstand massive declines in their revenue. The increase in COVID-19 cases coincided with April’s projected unemployment growth rate of 10 per cent.[[11]](#endnote-11)

With high unemployment rates and business closures, Canada passed a response bill to assist those who were economically impacted: Bill C-13, the COVID-19 Emergency Response Act. This bill, valued at CA$765 billion,[[12]](#endnote-12) provided monetary assistance to both businesses and individuals, and included the Canadian Emergency Response Benefit, which provided $2,000 per month to Canadians who were impacted by COVID-18 but did not qualify for Employment Insurance.[[13]](#endnote-13) Most importantly, this bill allocated $500 million in funding to support provinces with their health care system needs.

The sustainability of these economic response programs was questionable given the uncertainty of the virus’s spread. If the virus continued to adversely affect daily living, economic activity could not resume, further increasing Canada’s debt pool. Therefore, the role of COVID-19 testing had become integral to policy-making and public regulation. If Canada could effectively control the virus by increasing testing volume, then the country would be able to keep Canadians safe and restart the economy organically. However, if Canada could not increase its testing capacities, it would be unable to effectively control the virus or revamp the economy.

In early April, experts projected that Canada’s COVID-19 case numbers would increase, peaking in late April and early May (see Exhibit 2).[[14]](#endnote-14) Thereafter, the number of cases was expected to decline. An inevitablesecond wave, however, was expected to occur between September and November, with case counts worse than those in April.

BC’s Health Care System and the Regional Health Authorities

BC’s health care system was unique compared to those of its provincial neighbours. The infrastructure of BC’s health care system mimicked a centralized system, with the BC Ministry of Health (BC Health) overseeing the Provincial Health Services Authority (PHSA) and five regional health authorities (RHAs): Fraser Health Authority (Fraser Health), Interior Health Authority (Interior Health), Northern Health Authority (Northern Health), Vancouver Island Health Authority (Island Health), and VCHA (see Exhibits 3 and 4). The PHSA was generally responsible for governing and helping RHAs organize and deliver services.

The five RHAs, founded in 2001 under the Health Authorities Act, were responsible for planning and delivering all health services, including hospital management, long-term care, acute care, and public health, within each respective region.[[15]](#endnote-15) Given this centralized system, each RHA operated as a silo, loosely administered under the BC Health mandate and in close consultation with the PHSA. The divisions within these silos were strongly interconnected, tightly controlled, and mostly dependent on stakeholder consultation when planning strategy.

Each RHA, under regulations from the PHSA, was responsible for its own COVID-19 response strategy. However, the number of cases and associated issues within each region varied as a consequence of differences in population and demographics. What remained congruent was the PHSA’s stance on limiting false-positive tests. A false-positive test referred to a patient being incorrectly diagnosed as having COVID-19. This testing defect could have had widespread adverse economic implications, shuttering businesses and reducing trust in the health care system.

The Fraser Health Authority

Fraser Health was responsible for all health operations in Fraser Canyon, Burnaby, Abbotsford, Maple Ridge, Surrey, and the surrounding areas. This region subsumed three former health regions, making it the largest RHA in BC with respect to population (1.8 million residents) and budget ($3.8 billion in 2019/20).[[16]](#endnote-16) The Fraser Institute operated 12 acute care hospitals, with three regional hospitals: Abbotsford Regional Hospital and Cancer Centre, Royal Columbian Hospital, and Surrey Memorial Hospital (regional). It also operated nine community hospitals.[[17]](#endnote-17) Fraser Health had experienced a growing number of COVID-19 cases, peaking on March 23 with 56 new cases. Given the region’s size, it was projected that the number of cases would continue to grow and predominate in the province.[[18]](#endnote-18)

The Interior Health Authority

Interior Health provided health care for almost one million residents in the Southern Interior, Okanagan, and Kootenay regions of BC. With a $2.3 billion budget (2019/20),[[19]](#endnote-19) Interior Health oversaw 16 community hospitals, two tertiary hospitals, 22 health care centres and four regional hospitals.[[20]](#endnote-20) Interior Health had experienced steady growth in COVID-19 cases, peaking on March 25 and March 31, with 17 new cases.[[21]](#endnote-21)

The Northern Health Authority

Northern Health oversaw health care for 300,000 residents within a 600,000-kilometre region, including the cities of Dawson Creek, Haida Gwaii, and Prince Rupert. Northern Health was BC’s smallest region. With a budget of $0.84 million (2019/20), it encompassed 18 hospitals, with the largest being the University Hospital of Northern BC.[[22]](#endnote-22) Northern Health had experienced a low but stable number of COVID-19 cases, peaking on April 2, with four new cases.[[23]](#endnote-23)

The Vancouver Island Health Authority

Island Health was responsible for 850,000 residents within a 56,000-kilometre region on the island. This RHA operated within a $2.8 billion budget (2019/20) and oversaw operations for 150 hospitals and health centres, with the largest being the Royal Jubilee Hospital and Victoria General Hospital.[[24]](#endnote-24) Island Health had experienced a fairly stable number of COVID-19 cases, peaking on March 18and 19, with seven new cases.[[25]](#endnote-25)

The VCHA and Hospitals

The VCHA oversaw all health operations in Vancouver, Richmond, the North Shore, and surrounding areas along the Sea-to-Sky Highway, Sunshine Coast, and Central Coast. This region had 1.25 million residents, accounting for 25 per cent of the population of the province.[[26]](#endnote-26) This entity operated under a $3.7 billion budget (2019/20), employed 14,000 staff, 5,500 nurses, 2,700 physicians, and 900 investigative researchers.[[27]](#endnote-27)

The VCHA maintained two prominent hospitals, Vancouver General Hospital (VGH) and St. Paul’s Hospital (St. Paul’s), the latter of which was primarily used as a teaching hospital for the University of BC’s Faculty of Medicine. Due to its size, the VCHA had the largest number of COVID-19 cases in the province, with an all-time high of 43 new cases on March 25. Given its population, the VCHA was projected to see a spike in cases, as indicated by its proportion of the province’s positive cases since March 17 (see Exhibit 5).[[28]](#endnote-28)

St. Paul’s Hospital

St. Paul’s was located in east Vancouver and operated primarily as an acute care, teaching, and research hospital. This hospital was the seventh-oldest within the province and was currently being transitioned to a new location due to capacity concerns. The hospital contained 400 beds and had approximately 4,000 employees. St. Paul’s hosted a teaching centre with large lab facilities, which were mainly used for the University of BC’s Faculty of Medicine program.[[29]](#endnote-29) As a result, St. Paul’s had been the sole testing lab for all COVID-19 cases in the VCHA.

For testing, St. Paul’s lab received vials from collection centres within the region. The virus was individually tested using commercialized COVID-19 kits, as per Health Canada regulations. Although this model had proven somewhat successful in the short term, experts suggested that cases would continue to surge. It was likely that St. Paul’s would be unable to meet capacity or have sufficient supplies to combat the backlog independently.

Vancouver General Hospital

Located in Vancouver, VGH was Canada’s second-largest hospital. Given its size, VGH was also a research and teaching institute partnered with the University of BC’s Faculty of Medicine. It had sufficient testing space. On an annual basis, the hospital accommodated approximately 27,000 in-patient visits and 23,000 outpatient cases.[[30]](#endnote-30)

VGH’s research centre had state-of-the-art testing labs, which had been vacated since the virus’s first appearance in order to house over 1,000 beds. To replace the commercialized COVID-19 kits for genetic extraction, VGH had also been piloting in-house tests, which were projected to be ready for use by April 10, 2020.

The COVID-19 Testing Process

Collection and Swabbing (Collection Centres)

To locate a collection site, the VCHA listed seven potential collection centres across the region. These centres operated on a first-come, first-served basis (see Exhibits 6 and 7).

The swabbing that occurred at each collection centre involved the insertion of a long and skinny swab into the nose and mouth to test for viral cells. This process was relatively quick and was effective in gathering the necessary data. One swab was used per patient and was stored in its own vial, which was filled with a preservative fluid. This fluid removed the viral cells from the swab and preserved them for later testing. Initially, in March, the swab supply was scarce, as the VCHA could only access 5,000 per day. However, in April, hospitals acquired alternative sources, giving the VCHA access to 7,000 swabs per day.

At each centre, five full-time employees could each test 19 patients per hour. Henry, the provincial health officer, argued that mass testing was an ineffective strategy to slow transmission of COVID-19 because it had a false-negative rate as high as 30 per cent in people who were infected but did not show symptoms.[[31]](#endnote-31) As a result, collection centres reduced the number of tests per day and only tested individuals with symptoms. The VCHA’s collection centres experienced different demand levels, and, due to limited capacity and testing supplies, may have had to turn down individuals looking to be tested. Therefore, there was the potential for among between the test centres to improve capacity in this step.

Processing and Bar-Coding

COVID-19 swabs gathered from the collection sites were transported to St. Paul’s lab for processing and bar-coding. The vials were unloaded from trucks and then stored in a cooling-regulated fridge until processing started. All specimens were to be processed in preparation for genetic extraction. Once the specimens were ready, they were processed by machines at a constant rate. The lab operated 24 hours a day, every day, in three eight-hour shifts (with an hour break), where each shift had three full-time technicians working to individually bar-code the samples. Each technician could complete one sample in 0.4 minutes, excluding transport time between the fridge and the cart. This process was carefully completed, as cross-contamination due to sample mislabelling would have had adverse consequences.

Genetic Extraction

After the samples had been bar-coded, the vials were transported via cart to be genetically extracted. In this stage, all liquid from the COVID-19 swab vials was extracted to isolate the ribonucleic acid (RNA). This step was largely dependent on the availability of COVID-19 kits and the chemical reagents needed to test the RNA. This stage was carried out in the same lab, under the same hours. Six full-time doctors were tasked with isolating RNA from COVID-19 genetic extraction kits. These doctors generally did not work in shifts, as there was a shortage of experienced doctors. Therefore, each full-time doctor had a 10-hour workday, with a 1.5-hour break. On average, it took 0.6 minutes to complete one sample per technician.

These kits included several chemical reagents that were needed for accurate extraction. Given that COVID-19 testing had exploded across the globe, these tests had become increasingly unavailable. The complexity of these kits also made it difficult for BC Health to locate alternative solutions (as recommended by Health Canada) within the given time frame. BC Health had made an effort to reallocate the testing kits based on need, but the demand exceeded the supply. Technicians only had access to 3,000 kits per day, a supply that could have decreased if the cases continued to rise in other RHAs. As a result, there was a significant difference between how many tests the doctors could complete and how many tests they could complete given the supply constraint.

Amplification

Once the RNA had been extracted, the samples were transferred to the amplification stage. This stage occurred in the same lab at St. Paul’s, which helped concentrate the testing and its exposure to other variants. In this stage, a polymerase chain reaction test was conducted to search for the severe acute respiratory syndrome coronavirus 2 strain. Once located, it was then copied and amplified using a machine until it could be detected. This process required two main types of chemicals—transcriptase, which was used to convert RNA to deoxyribonucleic acid (DNA), and primers, which were typically two reagents that matched the DNA with the genetic material and latched onto the virus’s RNA, if applicable.[[32]](#endnote-32) The two reagents needed were provided in kits, which were allocated by the PHSA. The DNA was then processed through an additional machine and run through both hot and cold temperatures to amplify the virus’s genetic material in the sample.

This step operated with seven full-time technicians who completed eight-hour workdays with a one-hour break. These technicians used kits to complete this process and to ensure no cross-contamination. Each technician could load and process 1,000 samples per shift. However, there were only 6,000 kits allocated for use per day. If more cases were required, each health authority would need to send a request to the PHSA. As the VCHA was one of the largest health authorities, Scott was confident in acquiring more kits.

Counting

Following the amplification step, the DNA was carefully counted by a second expert to determine the cycle’s genetic material. If the material appeared over a dozen times, the patient tested positive. However, if the material appeared less frequently, the patient was not definitively positive for COVID-19.

Although this step was relatively simple, each technician carefully recorded their findings to avoid false-positive results. The counting process operated almost simultaneously with the amplification process, and thus operated for three shifts, where each shift was assigned three full-time technicians. Shifts ran on an eight-hour workday (with a one-hour break), with each technician counting at a rate of 0.5 minutes per sample.

Reporting

Once the sample had been determined to be positive or negative, the information was recorded and reported through a communication database called Ploverb. This system gathered all testing data throughout the province, which was reported to the people, governments, and testing labs. One full-time employee per shift completed this step. This reporting step took place within St. Paul’s lab; it was also subject to its hours, with three eight-hour shifts with a one-hour break. Each employee took approximately 0.2 minutes to input one dataset.

This step was highly dependent on its accuracy, as provincial reporting numbers dictated COVID-19 responses and policy changes. With the backlog the VCHA was experiencing, there were large inconsistencies between the number of COVID-19–infected residents and what was reported (see Exhibit 8).

Testing Lab Personal Protective Equipment

St. Paul’s testing lab had enough N95 masks, gloves, and other materials for operations. However, BC Health was concerned that these materials, including swabs and COVID-19 kits, would run out if testing were to increase in the future.

Retired Professionals

On March 12, BC Health and the College of Physicians and Surgeons of BC called on retired doctors to support the front-line workers to alleviate high hospital and testing capacity issues.[[33]](#endnote-33) This decision helped the RHA to reassign their workers where needed and to ensure that regular hospital and clinic operations could continue despite COVID-19. Recalling retired professionals was a viable option given the physicians’ experience and expertise regarding outbreaks (i.e., severe acute respiratory syndrome) and following testing and lab protocols.

As the cases continued to grow, the VCHA was under immense pressure to curb the spread of the virus in all capacities.

Personal Protective Equipment

At the beginning of the COVID-19 outbreak in BC, many doctors and medical professionals feared a PPE shortage would occur given the need for 60 million masks.[[34]](#endnote-34) Since other businesses and households would acquire PPE for their personal use, there was concern that there would not be enough supplies for the first responders and front-line workers. The most significant concern was the shortage of long swabs for COVID-19 testing and PPE. To combat this issue, the chief medical leaders of BC Health recalled all PPE among the RHAs and redistributed the resources based on necessity and case counts. As stated, this distribution strategy proved beneficial for the short term, as the VCHA was able to provide enough swabs for the April demand. However, a shortage was likely to reoccur if cases and testing capacity increased.

All medical PPE had to adhere to the provincial and federal standards outlined on the BC Centre for Disease Control’s website. The criteria guaranteed a standard of safety for both the front-line workers and the patients. Large corporations had been pivoting their business models to produce masks and other PPE needed to sustain medical operations across Canada. In BC, there had been talks that a Vernon company called V02 Master was developing a reusable mask that could replace the N95 disposable covers. Although the mask had not been medically tested, the VO2 Master mask filtrated at a 99 per cent rate, versus the N95 rate of 95 per cent.[[35]](#endnote-35)

Capacity and Supply Chain Issues

Scott addressed the short- and long-term action plan for the VCHA’s COVID-19 response plan and the consequences surrounding demand increases for April 2020. Experts advised that VCHA testing sites could see almost 7,000 people per day, with a 2 to 5 per cent growth rate weekly. Given the current systems in place, the VCHA was not prepared to accommodate this influx and would have to consider turning away patients.[[36]](#endnote-36)

Scott had been in talks with VGH’s test centre about reutilizing their lab to offset some testing constraints. VGH was able to open a collection and testing centre that would perform the first step of the swab collection and the third step of the genetic extraction. As the hospital had created its own testing and genetic extraction kits, it could operate without government supplies.

To operate the collection centre step, VGH would be open between 9:00 a.m. and 5:00 p.m. and would require 10 technicians to work an eight-hour day (with a one-hour break). Each technician would take 2.5 minutes to test one sample. Approximately 70 per cent of the Squamish Assessment Centre’s demand would be redistributed to VGH. For the genetic extraction step at VGH, the lab would require five full-time doctors to work a 10-hour day, with a 1.5-hour break. Similar to St. Paul’s, each doctor would take 0.6 minutes to test one sample.

Transitioning testing capacity in the swab collection and genetic extraction steps would help alleviate constraints and promote a more effective COVID-19 testing strategy. Given that VGH was also an educational hospital, proper equipment and systems were in place if needed to operate the counting and reporting steps. Both the counting and reporting steps would need technicians to perform at the same rate as St. Paul’s.

As all qualified technicians, doctors, and nurses worked on the front line to slow the transmission of COVID-19, the VCHA was experiencing a scarcity of qualified technicians. At VGH, to operate the counting and reporting steps, the VCHA would need to explore different options to ensure all steps were adequately staffed.

Interestingly, the Fraser Health region had seen success in its recent partnership with LifeLabs. This region had resolved their capacity constraints by outsourcing their testing at a costly rate. Since this relationship was new, there was uncertainty regarding its sustainability or accuracy with regard to test data.

Moving Forward

Scott recognized that her team had to finalize its strategy before the next morning’s report. She knew that any recommendations had to be immediate and easily implementable to combat the exponential growth rate of COVID-19.

Exhibit 1: COVID-19 Milestones in Canada

January 25: Health Canada reported its first case of COVID-19 after a traveller from Wuhan, China, flew to Toronto, Ontario.

January 28: Health Canada confirmed its second and third cases of COVID-19, one related to the traveller from January 25, and one in BC.

February 6: Health Canada mandated COVID-19 testing for all incoming travellers from China with symptoms.

February 20: Canada reported its first case related to travel outside of China.

February 26: Canada reported 12 confirmed cases (9 related to travel from China; 3 related to travel from Iran).

March 11: The WHO declared COVID-19 a pandemic.

March 16: Canada announced the closing of its borders to non-Canadians.

March 17: Ontario and Alberta both declared states of emergency.

March 18: Canada and the United States announced the closing of their shared border to all non-work-related travel. British Columbia and Saskatchewan both declared states of emergency.

March 19: New Brunswick declared a state of emergency.

March 20: Canadian COVID-19 cases surpassed 1,000. Manitoba declared a state of emergency.

March 25: The federal government declared that a 14-day quarantine for all arrivals was mandatory.

March 30: Defence minister Harjit Sajjan relocates 24,000 Canadian troops to fight COVID-19 on the front line. The Government of Canada announced the wage subsidy program for all businesses.

April 2: Canada’s COVID-19 deaths surpass 100 cases.

April 6: 3M Company confirmed a deal to provide Canada with essential N95 masks.

Note: WHO = World Health Organization.

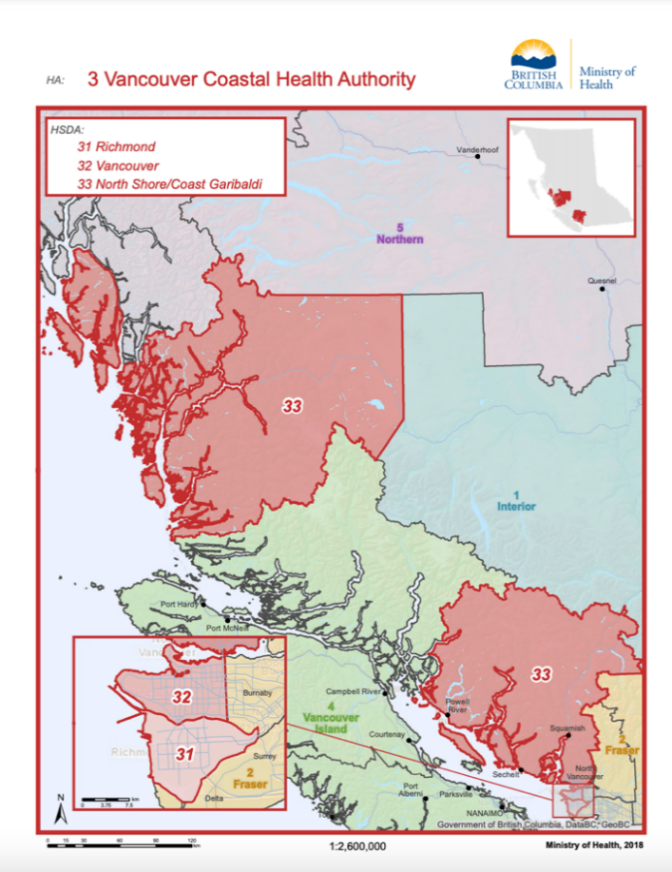
Source: Canadian Press, “A Timeline of Events in Canada's Fight against COVID-19,” *Toronto Star*, June 18, 2020, www.thestar.com/news/canada/2020/06/18/a-timeline-of-events-in-canadas-fight-against-COVID-19.html.

Exhibit 2: Total COVID-19 Cases in Canada

|  |  |  |  |
| --- | --- | --- | --- |
| **Date (2020)** | **New Positive Cases** | **Total Cases in**  **Canada** | **Total Tests** |
| March 17 | 156 | 587 |  |
| March 18 | 130 | 727 |  |
| March 19 | 145 | 872 | 981 |
| March 20 | 215 | 1,087 | 21,858 |
| March 21 | 244 | 1,331 | 12,069 |
| March 22 | 139 | 1,470 | 9,941 |
| March 23 | 621 | 2,091 | 8,323 |
| March 24 | 701 | 2,172 | 17,915 |
| March 25 | 617 | 3,409 | 17,092 |
| March 26 | 634 | 4,043 | 19,449 |
| March 27 | 714 | 4,757 | 9,041 |
| March 28 | 898 | 5,655 | 13,557 |
| March 29 | 665 | 6,320 | 26,234 |
| March 30 | 1,128 | 7,448 | 30,703 |
| March 31 | 1,143 | 8,591 | N/A |
| April 1 | 1,140 | 9,731 | 30,703 |
| April 2 | 1,552 | 11,283 | 11,221 |
| April 3 | 1,226 | 12,549 | 26,911 |
| April 4 | 1,469 | 14,018 | 16,906 |
| April 5 | 1,494 | 15,512 | 22,878 |
| April 6 | 1,155 | 16,667 | 1,957 |
| April 7 | 1,230 | 17,897 | 9,701 |

Source: “BC COVID-19 Data,” BC Centre for Disease Control, accessed October 23, 2020, www.bccdc.ca/health-info/diseases-conditions/COVID-19/data.

Exhibit 3: British Columbia Ministry of Health Breakdown by Regional Health Authority



Source: “Health Boundaries,” British Columbia, accessed March 1, 2021 https://www2.gov.bc.ca/gov/content/data/geographic-data-services/land-use/administrative-boundaries/health-boundaries.

Exhibit 4: Characteristics of each Regional Health Authority

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Regional Health Authority** | **2019/20 Budget (CA$ Billions)** | **Number of Patients Served (Millions)** | **Number of Staff** | **Number of Health Centres** |
| Fraser Health Authority | $3.8 | 1.8 | 26,000 staff  2,600 physicians  6,000 volunteers | 12 hospitals  12 health care centres |
| Interior Health Authority | $2.3 | 1.0 | 21,000 staff  1,900 physicians  4,800 volunteers | 22 hospitals  22 health care centres |
| Northern Health Authority | $0.84 | 0.3 | 7,000 staff | 18 hospitals  14 health care centres |
| Vancouver Island Health Authority | $2.8 | 0.85 | 23,000 staff  2,500 physicians  4,000 volunteers | 12 hospitals  27 health care centres |
| Vancouver Coastal Health Authority | $3.7 | 1.25 | 14,000 staff  2,700 physicians  900 researchers | 13 hospitals  18 health care centres  500 community care centres |

Source: Created by the authors based on Northern Health, *2019/20 – 2021/22 Service Plan*, May 2019, accessed March 1, 2021, https://www.northernhealth.ca/sites/northern\_health/files/about-us/reports/strategic-service-plans/documents/service-plan-2019-2022.pdf; “About Us,” Island Health, accessed March 1, 2021, www.islandhealth.ca/about-us; Interior Health Authority, *2019/20 – 2021/22 Service Plan*, December 2019, accessed March 1, 2021, https://www.interiorhealth.ca/AboutUs/Accountability/Documents/Service%20Plan%202019-20\_2021-22.pdf; Vancouver Coastal Health Authority, *2019/20 – 2021/22 Service Plan*, October 2019, accessed March 1, 2021, http://www.vch.ca/Documents/Service-Plan-2019.pdf; Fraser Health Authority, *2019/20 – 2021/22 Service Plan*, June 2019, accessed March 1, 2021, https://www.fraserhealth.ca/-/media/Project/FraserHealth/FraserHealth/About-Us/Accountability/Service-Plans/2019-20-2021-22-Service-Plan-Fraser-Health-FINAL.pdf?rev=cf381640b578419ba57008f558fd3f93.

Exhibit 5: Current Daily New COVID-19 positive Cases per Regional Health Authority

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Date** | **Fraser Health Authority** | **Interior Health Authority** | **Northern Health Authority** | **Vancouver Island Health Authority** | **Vancouver Coastal Health Authority** | **Total New** | **Total BC (Historic)** |
| March 17 | 11 | 1 | 0 | 4 | 25 | 41 | 103 |
| March 18 | 23 | 1 | 0 | 7 | 29 | 60 | 186 |
| March 19 | 12 | 4 | 0 | 7 | 24 | 47 | 231 |
| March 20 | 14 | 9 | 0 | 5 | 33 | 62 | 271 |
| March 21 | 3 | 6 | 0 | 2 | 35 | 46 | 424 |
| March 22 | 8 | 6 | 1 | 5 | 23 | 43 | 472 |
| March 23 | 56 | 1 | 1 | 1 | 28 | 88 | 617 |
| March 24 | 24 | 4 | 3 | 3 | 24 | 59 | 617 |
| March 25 | 26 | 17 | 0 | 5 | 43 | 91 | 721 |
| March 26 | 30 | 8 | 3 | 5 | 16 | 62 | 725 |
| March 27 | 22 | 10 | 0 | 3 | 27 | 62 | 725 |
| March 28 | 3 | 6 | 2 | 6 | 20 | 37 | 884 |
| March 29 | 2 | 5 | 0 | 1 | 22 | 30 | 884 |
| March 30 | 51 | 6 | 1 | 0 | 24 | 82 | 970 |
| March 31 | 16 | 17 | 1 | 5 | 16 | 56 | 1,013 |
| April 1 | 17 | 6 | 1 | 0 | 23 | 47 | 1,013 |
| April 2 | 28 | 2 | 4 | 2 | 19 | 55 | 1,121 |
| April 3 | 10 | 5 | 0 | 3 | 13 | 31 | 1,174 |
| April 4 | 3 | 0 | 1 | 3 | 14 | 21 | 1,203 |
| April 5 | 2 | 2 | 1 | 0 | 8 | 13 | 1,203 |
| April 6 | 26 | 3 | 0 | 0 | 22 | 51 | 1,266 |
| April 7 | 27 | 1 | 0 | 2 | 10 | 40 | 1,266 |

The reporting system experienced errors from March 26 to April 7, 2020.

Note: BC = British Columbia.

Source: “BC COVID-19 Data,” BC Centre for Disease Control, accessed October 23, 2020, www.bccdc.ca/health-info/diseases-conditions/COVID-19/data.

Exhibit 6: Process Flow of COVID-19 Testing

Collection centre tests Canadians

Test samples are sent to be bar-coded

Samples are genetically extracted

Sample data is amplified

Sample data is counted to identify COVIDCOVID-19

Test results are reported to the Vancouver Coastal Health Authority

Source: Alexandra Ossola, “Here Are the Coronavirus Testing Materials That Are in Short Supply in the US,” Quartz, March 25, 2020, https://qz.com/1822596/all-the-coronavirus-test-materials-in-short-supply-in-the-us/.

Exhibit 7: Collection Centres

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Collection Centre:** | **Vancouver Community College Collection Centre** | **North Vancouver COVID-19 Collection Centre** | **St. Vincent Collection Centre** | **Squamish Assessment Centre** | **Whistler Medical Clinic Assessment Centre** | **British Columbia Children's Hospital** | **Richmond Collection Centre** |
| Hours of Operation | 9:00 a.m.–7:00 p.m. | 8:00 a.m.–1:00 p.m. | 8:30 a.m.–4:30 p.m. | 9:00 a.m.–5:00 p.m. | 8:30 a.m.–4:30 p.m. | 10:00 a.m.–5:00 p.m. | 9:00 a.m.–4:00 p.m. |
| March Tests, Average per Day | 1,050 | 684 | 494 | 1,802 | 539 | 206 | 1,092 |
| Projected April Tests,  Average per Day | 1,300 | 700 | 520 | 2,000 | 600 | 500 | 1,100 |

Source: “COVID-19 Testing,” Vancouver Coastal Health, accessed March 1, 2021, www.vch.ca/COVID-19/COVID-19-testing.

Exhibit 8: Testing Process Summary

|  |  |  |
| --- | --- | --- |
| **Step** | Total Number of Employees | Time per Sample (Minutes) |
| Collection and Swabbing (7 Collection Centres) | 35\* | 3.16 |
| Processing and Bar-Coding | 9 | 0.4 |
| Genetic Extraction | 6 | 0.6 |
| Amplification | 7 | 0.42 |
| Counting | 9 | 0.5 |
| Reporting | 3 | 0.2 |

\* 35 employees across all seven collection centres.

Source: Adapted by the authors based on an interview with Rohan Noronha, a physician from Vancouver Coastal Health Authority and industry standards, September 31, 2020.

ENDNOTES

1. This case has been written on the basis of published sources only. Consequently, the interpretation and perspectives presented in this case are not necessarily those of the Vancouver Coastal Health Authority or any of its employees. [↑](#endnote-ref-1)
2. Interview with Rohan Noronha, a physician from VCHA on September 31, 2020. [↑](#endnote-ref-2)
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17. “About Fraser Health,” Fraser Health, Fraser Health, accessed October 23, 2020, www.fraserhealth.ca/about-us/about-fraser-health. [↑](#endnote-ref-17)
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30. Ibid. [↑](#endnote-ref-30)
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